

Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms

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Abstract

The purpose of the present study was to examine the potential efficacy, patient acceptability, and feasibility of a novel, cognitive-behavioral therapy (CBT) for adults with attention-deficit hyperactivity disorder (ADHD) who have been stabilized on medications but still show clinically significant symptoms. Thirty-one adults with ADHD and stable psychopharmacology for ADHD were randomized to CBT plus continued psychopharmacology or continued psychopharmacology alone. Assessments included ADHD severity and associated anxiety and depression rated by an independent evaluator (IE) and by self-report. At the outcome assessment, those who were randomized to CBT had lower IE-rated ADHD symptoms ($p < .01$) and global severity ($p < .002$), as well as self-reported ADHD symptoms ($p < .0001$) than those randomized to continued psychopharmacology alone. Those in the CBT group also had lower IE-rated and self-report anxiety (p 's $< .04$), lower IE-rated depression ($p < .01$), and a trend to have lower self-reported depression ($p = .06$). CBT continued to show superiority over continued psychopharmacology alone when statistically controlling levels of depression in analyses of core ADHD symptoms. There were significantly more treatment responders among patients who received CBT (56%) compared to those who did not (13%) ($p < .02$). These data support the hypothesis that CBT for adults with ADHD with residual symptoms is a feasible, acceptable, and potentially efficacious next-step treatment approach, worthy of further testing.

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1. Introduction

Although previously controversial, ADHD in adulthood is a valid, reliably diagnosed disorder which causes significant functional impairment including problems with employment, education, economic and social functioning (Adler & Chua, 2002; Biederman et al., 1993; Biederman, Wilens, & Spencer, 1998; Biederman et al., 1996; Klein & Mannuzza, 1991; Lahey, Piacentini, McBurnett, Stone, Hartdagen, & Hynd, 1988; Morrison, 1980; Murphy & Barkley, 1996a,b; Ratey, Greenberg, Bemporad, & Lindem, 1992; Shekim, Asarnow, Hess, Zaucha, & Wheeler, 1990; Spencer, Biederman, Wilens, & Faraone, 1994; Spencer, Biederman, Wilens, & Faraone, 1998; Sprich, Biederman, Crawford, Mundy, Faraone, & Stevenson, 2000; Wilens, Biederman, Brown, Monuteaux, Prince, & Spencer, 2002a; Wilens, Biederman, & Mick, 1998). Estimates of the prevalence of ADHD in adulthood range from 1% to 5% (Bellak & Black, 1992; Biederman et al., 1996; Murphy & Barkley, 1996a,b; Shekim et al., 1990), a finding supported by follow-up studies of children diagnosed with ADHD indicating that impairing ADHD symptoms persist into adulthood (beyond adolescence) in 30–80% of diagnosed children (Barkley, Fischer, Edelbrock, & Smallish, 1990; Gittelman, Mannuzza, Shenker, & Bonagura, 1985; Mannuzza, Klein, Bessler, Malloy, & LaPadula, 1993; Mannuzza, Klein, Bonagura, Malloy, Giampino, & Addalli, 1991; Mendelson, Johnson, & Stewart, 1971; Weiss & Hechtman, 1993).

Psychopharmacology has been the only rigorously studied treatment option for adults with ADHD. However, in controlled studies of stimulant medications, and open studies of tricyclic, monoamine oxidase inhibitor, and atypical antidepressants, 20–50% of adults are considered nonresponders due to insufficient symptom reduction or inability to tolerate these medications (Wender, 1998; Wilens et al., 2002b). Moreover, adults who are considered responders typically show a reduction in only 50% or less of the core symptoms of ADHD (Wilens, Biederman, & Spencer, 1998; Wilens et al., 2002b). Given these data, guidelines for pharmacological interventions call for adjunctive behavioral treatments (Dulcan & Benson, 1997), and clinical recommendations and guidelines exist for providing psychotherapy for adults with ADHD (Hallowell, 1995; McDermott, 2000; Nadeau, 1995). However, prior to the present study, virtually no studies have investigated the potential efficacy of such psychosocial interventions (Safren, Sprich, Chulvick, & Otto, 2004) either in general, or as a next step approach to treating those who have been stabilized on medications but still show residual symptoms.

To improve upon therapeutic outcomes among adults with ADHD, we developed and tested a novel cognitive-behavioral treatment for adults with ADHD who were stabilized on psychopharmacology. We reasoned that psychopharmacology may ameliorate many of the core symptoms of ADHD (attentional problems, high activity, impulsivity), but believe that it does not provide a patient with concrete strategies and skills for coping with associated functional impairment (Safren et al., 2004). Quality of life impairments such as underachievement, daily organizational and administrative goals (i.e. bills, mail, hassles), weekly work or school related tasks, and relationship difficulties associated with ADHD in adulthood (Biederman et al., 1993; Murphy & Barkley, 1996a,b; Ratey et al., 1992) require active problem-solving, which can be achieved with skills training over and above medication management.

With attention to problems involved in extending efficacious interventions to clinical practice, we employed a modular approach to the intervention, formulating specific components to match specific problem areas (Eifert, Schulte, Zvolensky, Lejuez, & Lau, 1997; Henin, Otto, & Reilly

Harrington, 2001). The intervention approach was also based on pilot work in our laboratory on a cognitive-therapy based treatment of medicated adults with ADHD (McDermott, 2000; Wilens et al., 2002b). Core modules that all patients received were (1) organization and planning, (2) coping with distractibility, and (3) cognitive restructuring. Optional modules included (1) procrastination, (2) anger management, and (3) communication skills (Safren et al., 2004).

2. Method

2.1. Study design

Thirty-one men and women who met DSM-IV criteria for ADHD in adulthood were randomly assigned to one of two conditions. The first condition was cognitive-behavioral therapy, as developed by the research team for the present study, plus continued psychopharmacology as already prescribed by their physician. The second condition was continued psychopharmacology alone. As this study represents the first step in developing and testing this intervention, the control group was a treatment as usual control, however, all individuals were treated with a variety of psychopharmacological regimens for ADHD.¹ The requirement for study entry was stable medications prescribed for ADHD for two months, and no more than 10% change in the dosage of existing medicines for 1 month.

After an initial evaluation to determine study eligibility, there were two assessment study visits: a baseline assessment, and an outcome assessment. The baseline and outcome assessments consisted of a clinician-administered interview by an evaluator who was blind to treatment condition, and a battery of self-report measures.

The following inclusion criteria were employed: participants must have had a principal diagnosis of Attention-Deficit Hyperactivity Disorder with external validation of childhood onset and clinical severity of at least a moderate level (Clinical Global Impression; CGI of 4 or above). Participants must have been between the age of 18 and 65, must have been able to give informed consent and comply with study procedures, and must have been stabilized on medications for ADHD or related symptoms. Stabilization on medications was defined as no more than 10% change in medication dose over a two-month period with clinical evidence of improvement compared to the patients' unmedicated status.

Exclusion criteria were moderate to severe major depression, clinically significant panic disorder, organic mental disorders, psychotic spectrum disorders, bipolar disorders, active substance abuse or dependence (past three months), pervasive developmental disorder, active suicidality, previous history of cognitive-behavioral therapy (CBT), and, due to the verbal and cognitive aspects of the proposed intervention, an estimated or documented verbal IQ of less than 90 (using clinic records or, for patients without IQ testing on file, administration of the information, vocabulary, and similarities subscales of the WAIS-III) (Wechsler, 1997).

¹Adequacy of psychopharmacotherapy was not formally assessed as part of this study. Most patients were on a stimulant medication and/or Bupropion (Wellbutrin), Venlafaxine (Effexor).

2.2. *Description of CBT for adult ADHD and continued psychopharmacology*

In the present study, CBT for adult ADHD consisted of three core modules, and three optional modules. Four licensed psychologists with experience in delivering CBT were the therapists, assisted in the development of the specific intervention, and met with the lead author for clinical supervision. All modules contained elements of motivational interviewing, and practice, repetition and review of previously learned skills. The first core module (four sessions) focused on psychoeducation about ADHD and on training in organizing and planning. This involved working with patients to use and maintain a notebook with a task list and a calendar system, as well to learn problem-solving skills such as breaking a large, seemingly overwhelming task into steps, and using a system to develop and choose an action plan for overwhelming tasks. The second module (three sessions) involved learning skills to reduce distractibility by determining the length of time one can hold his or her attention and using the previously learned skills to break tasks into chunks that take this amount of time. It also utilized tools such as alarms and timers to help patients stay on task, and a procedure called “distractibility delay” adapted from CBT for GAD (Craske, Barlow, & Meadows, 2000), whereby patients were instructed to write down distractions when they emerge rather than act on the distraction; and then return to the task at hand. The third core module was cognitive restructuring. This involved learning skills to maximize adaptive thinking during times of stress, and to apply adaptive thinking skills to difficulties associated with ADHD. Procedures for cognitive restructuring were identical to those outlined by Beck (1995) except that they also account for the tendency for patients with ADHD to be drawn to attractive, yet maladaptive thoughts (McDermott, 2000).

Participants also completed optional modules of treatment if they showed evidence of clinically significant difficulties in these symptom domains (see Section 2.3 regarding rating of these domains). The optional modules were (1) procrastination—using the previously learned skills applied specifically to the issue of procrastination, (2) anger and frustration management—emphasizing cognitive restructuring skills in addition to stress reduction techniques and assertiveness training, and (3) communication skills—training in active listening, learning to wait for others to finish speaking before adding to the conversation, maintaining appropriate eye contact, and learning to stay on topic.

Participants who were randomized to either condition continued on their medications for ADHD as prescribed by their provider. Participants in the continued psychopharmacology alone condition, who did not receive any CBT, returned for the outcome assessment approximately 15 weeks after completing the baseline independent assessment. After the outcome assessment, these individuals were offered CBT through the MGH Outpatient Psychiatry Department’s CBT Program if they desired it. All study procedures were reviewed and approved by the Massachusetts General Hospital Institutional Review Board, and all participants completed the informed consent process and signed informed consent forms.

2.3. *Assessment measures and procedures*

There were three components to the assessments: a diagnostic evaluation, independent evaluation by an assessor blinded to treatment assignment, and a battery of self-report measures. Independent assessor ADHD severity ratings were the primary outcome variables. All of the

initial evaluations were conducted by the first author, who is a licensed psychologist with extensive diagnostic interviewing training and experience using structured assessments of DSM-IV psychiatric disorders. The independent assessments were conducted by the third author who is also a licensed psychologist with extensive diagnostic interviewing experience, as well as specific training in assessing ADHD from the MGH ADHD program.

The initial evaluation for study entry included a diagnostic evaluation utilizing the Structured Clinical Interview for DSM-IV (SCID-IV; First, Spitzer, Gibbon, & Williams, 1996), supplemented by sections of the Kiddie Schedule for Affective Disorders and Schizophrenia-Epidemiologic Version (Kiddie-SADS-E; Orvaschel, 1985) to assess ADHD. For ADHD symptoms, Kiddie SADS-E questions were worded in the past tense, and participants were asked if similar problems are current. The following criteria were obtained to obtain a definite diagnosis of adulthood ADHD: (1) full DSM-IV criteria by the age of 7 (with documented external validation) as well as concurrently, (2) description of a chronic course of ADHD symptoms from childhood until adulthood, and (3) endorsement of a moderate or severe level of impairment attributable to the ADHD symptoms (ADHD CGI = 4 or greater). In previous studies conducted in our laboratory, diagnostic reliability of ADHD has been high, with a kappa of 1.0 being obtained, and a 95% confidence interval of 0.8–1.0 (Spencer, Wilens, Biederman, Faraone, Ablon, & Lapey, 1995). When available, we utilized external validation of childhood onset of symptoms by review of school records or by administering the ADHD rating scale (Barkley & Murphy, 1998; DuPaul, 1990) to the parent (or other relative) of the adult participant, wording items in the past tense to reflect childhood symptoms. This information was available for 48% of the sample, and all parents or documents verified ADHD in these cases.

The baseline independent assessment occurred after the evaluation, and the outcome assessment at the end of CBT or 15 weeks later. The independent evaluator who was blind to study condition first administered the ADHD rating scale (Barkley & Murphy, 1998; DuPaul, 1990). This scale, updated for DSM-IV, assesses each of the 18 individual symptoms of ADHD using an identical four-point severity grid (0 = not present; 3 = severe; minimum total score = 0, maximum total score = 54). This scale has been shown to be correlated with ADHD in adults, and has been shown to be sensitive to medication effects in pediatric (Barkley et al., 1990; Faries, Yalcin, Harder, & Heiligenstein, 2001) and adult samples (Spencer et al., 1995; Wilens et al., 1996). The evaluator also administered the Structured Version (Williams, 1988) of the Hamilton Depression Scale (HAM-D; Hamilton, 1960) and the structured (Shear et al., 2001) Hamilton Anxiety Scale (HAM-A; Hamilton, 1959). These scales are widely used in psychiatric research and have strong psychometric reliability and validity. For purposes of targeting the optional modules in the CBT sessions, the independent assessor rated the following five symptom domains as either none, mild, moderate, or severe: (1) organization and planning, (2) distractibility, (3) procrastination, (4) anger and frustration management, and (5) communication skills. Lastly, the independent evaluator rated Clinical Global Impression (CGI; NIMH, 1985) for severity (1 = not ill, to 7 = extremely ill). Instead of using the CGI improvement measure, we calculated global improvement by subtracting baseline scores from outcome scores on the CGI. We used a two-point change in clinical global impression as a conservative way to categorize patients as “responders” or “nonresponders”.

At the baseline and outcome assessment, participants rated their own level of severity on each of the 18 symptoms of ADHD using the Current Symptoms Scale (Barkley & Murphy, 1998).

This measure also includes functional impairment in various areas of life activities. They also completed the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), and the Beck Anxiety Inventory (Beck, Epstein, Brown, & Steer, 1988). These two measures have strong psychometric reliability and validity, and are widely used in psychiatric research.

2.4. Statistical analyses

The two conditions, (1) cognitive behavioral therapy plus continued psychopharmacology and (2) continued psychopharmacology alone, were compared using analysis of covariance of the assessments at the outcome. For each dependent variable, the baseline score was utilized as the covariate, treatment condition (CBT or continued psychopharmacology alone) as an independent variable, and the endpoint score as the dependent variable. Chi-square analyses were used to examine differential response rates between the treatment conditions. To compliment traditional significance testing, we computed between-group effect sizes ($d = \text{Mean}_{\text{change score CBT group}} - \text{Mean}_{\text{change score comparison group}} / \text{SD}_{\text{pooled}}$) for the continuous outcome measures, and used the table provide by Glass, McGaw, and Smith (1981) for computation for categorical outcomes (responder status).

3. Results

3.1. Participant characteristics

Forty individuals screened for the study, undergoing the baseline evaluation. Nine of these individuals did not enroll because one did not meet criteria for primary ADHD, four had not stabilized their medications or were not on medications, one had active cannabis use that may have been the cause of ADHD symptoms, one had a severe learning disability and probably IQ less than 90, one moved after the evaluation, and one did not complete the evaluation. Thirty-one adults (14 men, 17 women) who met inclusion criteria were randomly assigned to one of two conditions: cognitive-behavioral therapy plus continued psychopharmacology or continued psychopharmacology alone.

Of the 31 individuals in the study (none dropped out), 13% were ethnic minorities (African American, Asian, Hispanic/Latino, and Native American), and the mean age was 45.5 (SD=10.6, range=23–59). Fifty-two percent of the participants were working full time or in school, and 48% were unemployed or working only part-time. At baseline, the CBT group and the comparison group did not differ by age, sex, percentage of ethnic minorities, or percentage of individuals working or in school. A series of independent *t*-tests also revealed no baseline differences between the two conditions on any of the outcome variables (i.e. ADHD severity, depression, anxiety).

3.2. Primary outcome variables

Means and standard deviation scores for all outcome variables are presented in Table 1.

Table 1

Dependent variables at baseline and outcome for patients randomly assigned to CBT plus continued psychopharmacology or continued psychopharmacology alone

Measure	CBT plus continued psychopharmacology (<i>n</i> = 16)		Continued psychopharmacology alone (<i>n</i> = 15)	
	Baseline mean (SD)	Outcome mean (SD)	Baseline mean (SD)	Outcome mean (SD)
<i>IE measures</i>				
ADHD symptom severity	29.37(7.26)	15.19(7.12)	26.00(5.70)	20.80(10.84)
Clinical global impression	5.00(.89)	3.31(.79)	4.67(.49)	4.13(1.12)
Hamilton depression	8.31(6.88)	4.44(2.70)	9.87(5.05)	10.00(7.78)
Hamilton anxiety	10.81(6.94)	7.25(5.75)	13.00(6.12)	12.93(7.29)
<i>Self-report measures</i>				
ADHD symptom	29.69(8.52)	14.75(8.65)	26.40(10.88)	23.87(9.92)
Beck depression	11.88(8.07)	7.63(4.26)	14.13(6.46)	12.40(7.70)
Beck anxiety	6.19(7.17)	3.69(3.52)	6.93(4.10)	7.20(4.90)

Note: IE = independent evaluator.

Patients who received cognitive-behavioral therapy plus continued psychopharmacology had significantly lower independent-evaluator-rated scores on the ADHD rating scale ($F(1,28) = 8.72, p < .01$) and lower independent-evaluator rated overall CGI-severity scores ($F(1,28) = 12.95, p < .002$) at the post-treatment assessment than those who were assigned to continued psychopharmacology alone. The effect sizes for between groups change scores were 1.2 for the ADHD rating scale and 1.4 for the CGI. Accordingly, there were a greater proportion of responders in the CBT condition (9 of the 16, 56%) than in the continued psychopharmacology-alone condition (2 of the 15, 13%) ($\chi^2(1) = 6.23, p < .02$). The effect size for this categorical outcome was 1.2. Those who received CBT also had lower overall self-reported ADHD severity scores on the Current Symptom Scale at the post-treatment outcome assessment than those who were randomized to continued psychopharmacology alone ($F(1,28) = 22.76, p < .0001$). The between-groups effect size for this difference was 1.7.

3.3. Secondary symptoms outcome variables

Patients who received CBT had lower depression scores, as rated by the independent evaluator on the Hamilton Depression Scale ($F(1,28) = 8.72, p < .01$, effect size = .65). There was a trend for a similar pattern of results for Beck Depression Inventory scores ($F(1,28) = 3.84, p = .06$, effect size = .39). Patients who received CBT also had significantly lower anxiety scores, as reflected by independent evaluator ratings on the Hamilton Anxiety Scale ($F(1,28) = 4.82, p < .04$, effect size = .55), and self-ratings on the Beck Anxiety Inventory ($F(1,28) = 5.00, p < .04$, effect size = .43).

3.4. Replication outcome analyses covarying baseline depression

Because CBT is known to treat depression, we conducted a series of replication analyses, covarying change scores for the depression measures from baseline to endpoint. The Hamilton

Depression Rating Scale scores were used for independent evaluator ratings, and the Beck Depression Inventory for the self-reported ADHD symptoms scores. In all three analyses, we continued to obtain significant differences between treatment groups for independent-evaluator symptom severity ($F(1, 27) = 6.67, p < .02$) for CGI ($F(1, 27) = 10.54, p < .01$), and for self-report ADHD symptom scores ($F(1, 27) = 10.54, p < .01$). In seeking to parcel out any effects related to depression, we also reran these analyses covarying out baseline depression scores. A similar pattern emerged, with CBT being superior to continued psychopharmacology alone ($F(1, 27) = 10.55, p < .01$ for ADHD symptom scores; $F(1, 27) = 7.45, p < .02$, for CGI, and ($F(1, 27) = 19.87, p < .0001$) for ADHD self-reported symptom severity scores).

4. Discussion

The present study was designed to evaluate the potential efficacy, patient acceptability, and feasibility of a novel cognitive-behavioral therapy for adults with ADHD who have not fully responded to medications alone. The treatment was shown to be acceptable and tolerable to patients: none who were randomized dropped out. Across all of the primary outcome measures, those who were randomized to CBT showed significantly better ratings than those randomized to psychopharmacology alone. This included analyses of core ADHD symptoms, rated by an independent evaluator and self-report, as well as a conservative categorical analysis of individuals considered to be full treatment responders (56% versus 13%). Those who received CBT also had significantly reduced symptom scores on secondary outcomes—anxiety and depression ratings. Examination of treatment effect sizes indicated large effect sizes (Cohen, 1992) for benefit for CBT over the control group for core ADHD symptoms.

A number of factors suggest that the efficacy of our intervention is not limited to the well-documented effects of CBT on mood disturbance (see for example (Dobson, 1989)). First, a substantial number of individuals did not have clinically significant depression or anxiety at baseline; elevated depression or anxiety was not part of the inclusion criteria. Second, the magnitude of effects of treatment on ADHD symptoms was generally higher than the effects on depression scores as judged by effect sizes. Finally, we statistically controlled levels of baseline depression and depression change scores in follow-up outcome analyses, and found that ADHD symptoms improved significantly and independently of these effects. These results support the contention that our treatment approach, which was designed to target ADHD symptoms, did successfully and specifically target these problems.

The treatment improvements are consistent with recent conceptual models of ADHD in adulthood (Barkley, 1997; Quay, Focacci, Quayle, Politch, & Anderson, 1997; Safren et al., 2004). Accordingly, ADHD is a neurobiological disorder, which results in core deficits such as impulsivity, attentional deficits, and disinhibition. In the absence of compensatory strategies, these core deficits can directly or indirectly result in a chain of continued cognitive and behavioral impairments, which can, in turn, result in symptom maintenance and exacerbation, and functional impairment. Although medicines are thought to help with the core neurobiological impairments, they do not ensure that patients will adopt compensatory strategies. The adjunctive treatment under study was targeted to teaching patients to actively cope with core ADHD symptoms by

increasing compensatory strategies in organizing and planning, coping with distractibility, and enhancing optimal thinking strategies.

The positive finding of CBT with adults in the present study stands in contrast to mixed findings with children. Some studies have found beneficial effects for CBT in children with ADHD (Fehlings, Roberts, Humphries, & Dawe, 1991; Meichenbaum & Goodman, 1971) with behavioral parent training and behavioral classroom interventions meeting criteria for well-established treatments (Pelham, Wheeler, & Chronis, 1998). However, other studies have failed to find an effect for combined medication and behavioral treatment relative to an adequate dose of medication alone (Abikoff & Gittelman, 1985; Brown et al., 1985; Horn et al., 1991; Klein & Abikoff, 1999). There are several differences in the CBT approach for adults that may explain the difference between our findings and findings with children. First, adults with greater life experience and skills and more developed cognitive capabilities may be better able to utilize CBT than young people. Second, parents or caretakers typically refer youth who participate in treatment. Therefore, it is the parents' goal to decrease the symptoms, and this may not be consistent with the patients' goals. Our sample of self-referred adults may well have stronger motivation for treatment. Finally, there is some suggestion that the lack of consistent positive findings for CBT in youth may be due to the heterogeneity of difficulties that youth with ADHD face and the limited focus of treatments (see Southam-Gerow et al., 1997 for a review). Accordingly, psychosocial treatments for youth with ADHD may need to be further refined with increasing attention to the importance of comprehensive treatment that specifically targets the patients' symptoms.

There were several limitations to this small-scale study, which represents the first test of this cognitive behavioral therapy for adults with ADHD. First, the small sample size points to the importance of replication. Second, the pharmacotherapy was not controlled, and, despite instructions not to change medicines, we discovered that two individuals in the continued psychopharmacology condition and one individual in the CBT condition changed medicines during the study period. Replication analyses, however revealed a similar pattern of results when excluding these individuals from analysis. Upon discovery, we adopted procedures to more actively monitor medicine changes and remind patients of this requirement. Future study should employ these strategies throughout, as well as insure adequacy of stable medication treatment before randomization. The study also only examined post-treatment outcome, and did not have a follow-up period to investigate maintenance of gains. Finally, the comparison group was a no-additional treatment control. Hence, the potential effects of therapist attention or other common aspects of psychotherapy were not accounted for, and further study should compare this specific treatment to a credible placebo psychotherapy control.

Despite these limitations, the present sample consisted of medication-treated individuals who had not achieved adequate control of their symptoms. The treatment therefore was successful in an otherwise treatment-refractory population. Despite the underlying neurobiological basis of ADHD, cognitive-behavioral therapy was successful as a next-step treatment approach in patients receiving medications. Statistically reliable and clinically significant improvements were observed in patients who received CBT compared to those who did not. Accordingly, cognitive-behavioral therapy appears to be a useful component of treatment for adults with ADHD who do not fully respond to medications alone. These data support conducting a larger-scale efficacy trial of this intervention to replicate and extend on these preliminary findings.

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References

- Abikoff, H., & Gittleman, R. (1985). Hyperactive children treated with stimulants. *Is cognitive training a useful adjunct. Archives of General Psychiatry*, 42, 953–961.
- Adler, L., & Chua, H. (2002). Management of ADHD in adults. *Journal of Clinical Psychiatry*, 63, 29–35.
- Barkley, R. (1997). *ADHD and the nature of self-control*. New York: Guilford Press.
- Barkley, R., Fischer, M., Edelbrock, C., & Smallish, L. (1990). The adolescent outcome of hyperactive children diagnosed by research criteria: I. An 8-year prospective follow-up study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 29, 546–557.
- Barkley, R., & Murphy, K. (1998). *Attention-deficit hyperactivity disorder: a clinical workbook* (2nd ed.). New York: Guilford Press.
- Beck, A., Epstein, N., Brown, G., & Steer, R. (1988). An inventory for measuring clinical anxiety: psychometric properties. *Journal of Consulting and Clinical Psychology*, 49, 448–454.
- Beck, A., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561–571.
- Beck, J. (1995). *Cognitive therapy: basics and beyond*. New York: Guilford Press.
- Bellak, L., & Black, R. (1992). Attention-deficit hyperactivity disorder in adults. *Clinical Therapeutics*, 14, 138–147.
- Biederman, J., Faraone, S. V., Spencer, T., Wilens, T., Norman, D., & Lapey, K. A., et al. (1993). Patterns of psychiatric comorbidity, cognition, and psychosocial functioning in adults with attention deficit hyperactivity disorder. *American Journal of Psychiatry*, 150(12), 1792–1798.
- Biederman, J., Wilens, T., & Spencer, T. (1998). Adults with attention-deficit/hyperactivity disorder: a controversial diagnosis. *Pediatrics*, 102, 501–506.
- Biederman, J., Wilens, T., Spencer, T., Farone, S., Mick, E., & Ablon, J., et al. (1996). Diagnosis and treatment of adult attention-deficit/hyperactivity disorder. In M. Pollack, M. Otto, & J. Rosenbaum (Eds.). *Challenges in clinical practice* (pp. 380–407). New York: The Guilford Press.
- Brown, R. T., Wynne, M. E., & Medenis, R. (1985). Methylphenidate and cognitive therapy: A comparison of treatment approaches with hyperactive boys. *Journal of Abnormal Child Psychology*, 13, 69–87.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159.
- Craske, M., Barlow, D., & Meadows, E. (2000). *Mastery of your anxiety and panic (MAP-3)*. New York: Academic Press.
- Dobson, K. S. (1989). A meta-analysis of the efficacy of cognitive therapy for depression. *Journal of Consulting and Clinical Psychology*, 57, 414–419.
- Dulcan, M. K., & Benson, R. S. (1997). AACAP Official Action. Summary of the practice parameters for the assessment and treatment of children, adolescents, and adults with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 1311–1317.
- DuPaul, G. (1990). *The ADHD rating scale: normative data, reliability, and validity*. Unpublished manuscript of the University of Massachusetts Medical School.
- Eifert, G. H., Schulte, D., Zvolensky, M. J., Lejuez, C. W., & Lau, A. W. (1997). Manualized behavior therapy: merits and challenges. *Behavior Therapy*, 28, 499–509.
- Faries, D. E., Yalcin, I., Harder, D., & Heiligenstein, J. H. (2001). Validation of the ADHD Rating Scale as a clinician administered and scored instrument. *Journal of Attention Disorders*, 5, 107–115.
- Fehlings, D. L., Roberts, W., Humphries, T., & Dawe, G. (1991). Attention deficit hyperactivity disorder: does cognitive behavioral therapy improve home behavior? *Journal of Developmental Behavioral Pediatrics*, 12, 223–228.

- First, M., Spitzer, R., Gibbon, M., & Williams, J. (1996). Structured clinical interview for DSM-IV Axis I Disorders—Patient Edition (SCID-I/P, version 2). In *Biometrics research*. New York: New York State Psychiatric Institute.
- Gittelman, R., Mannuzza, S., Shenker, R., & Bonagura, N. (1985). Hyperactive boys almost grown up. I. Psychiatric status. *Archives of General Psychiatry*, 42, 937–947.
- Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research*. Beverly Hills, CA: Sage Publications.
- Hallowell, E. M. (1995). Psychotherapy of adult attention deficit disorder. In K. G. Nadeau (Ed.). *A comprehensive guide to attention deficit disorder in adults: research, diagnosis, and treatment* (pp. 146–167). New York: Brunner/Mazel.
- Hamilton, M. (1959). The assessment of anxiety states by rating. *British Journal of Medical Psychology*, 32, 50–55.
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery and Psychiatry*, 23, 56–61.
- Henin, A., Otto, M. W., & Reilly Harrington, N. A. (2001). Introducing flexibility in manualized treatment: application of recommended strategies to the cognitive-behavioral treatment of bipolar disorder. *Cognitive and Behavioral Practice*, 8, 317–328.
- Horn, W. F., Ialongo, N. S., Greenberg, G., Packard, T., Lopez, M., Wagner, A., & Puttler, L. (1991). Additive effects of psychostimulants, parent training, and self-control therapy with ADHD children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 233–240.
- Klein, R. G., & Abikoff, H. (1999). Behavior therapy and methylphenidate in the treatment of children with ADHD. *Journal of Attention Disorders*, 2, 89–114.
- Klein, R., & Manuzza, S. (1991). Long term outcome of hyperactive children: a review. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 383–387.
- Lahey, B. B., Piacentini, J. C., McBurnett, K., Stone, P., Hartdagen, S., & Hynd, G. (1988). Psychopathology in the parents of children with conduct disorder and hyperactivity [erratum appears in *Journal of the American Academy of Child and Adolescent Psychiatry* 1988 July 27, 516]. *Journal of the American Academy of Child & Adolescent Psychiatry*, 27, 163–170.
- Mannuzza, S., Klein, R. G., Bessler, A., Malloy, P., & LaPadula, N. (1993). Adult outcome of hyperactive boys: educational achievement, occupational rank, and psychiatric status. *Archives of General Psychiatry*, 42, 937–947.
- Mannuzza, S., Klein, R. G., Bonagura, N., Malloy, P., Giampino, T. L., & Addalli, K. A. (1991). Hyperactive boys almost grown up. V. Replication of psychiatric status. *Archives of General Psychiatry*, 48, 77–83.
- McDermott, S. P. (2000). Cognitive therapy of adults with Attention-Deficit/Hyperactivity Disorder. In T. Brown (Ed.). *Attention deficit disorders and comorbidity in children, adolescents, and adults*. Washington, DC: American Psychiatric Press.
- Meichenbaum, D. H., & Goodman, J. (1971). Training impulsive children to talk to themselves: a means of developing self-control. *Journal of Abnormal Psychology*, 77, 115–126.
- Mendelson, W., Johnson, N., & Stewart, M. A. (1971). Hyperactive children as teenagers: a follow-up study. *The Journal of Nervous and Mental Disease*, 163, 273–279.
- Morrison, J. (1980). Adult psychiatric disorders in parents of hyperactive children. *Journal of Clinical Psychiatry*, 41, 40–43.
- Murphy, K., & Barkley, R. (1996a). Prevalence of DSM-IV symptoms of ADHD in adult licensed drivers: implications for clinical practice. *Journal of Attention Disorders*, 1, 147–161.
- Murphy, K., & Barkley, R. A. (1996b). Attention deficit hyperactivity disorder adults: comorbidities and adaptive impairments. *Comprehensive Psychiatry*, 37, 393–401.
- NIMH (1985). CGI: Clinical Global Impression Scale—NIMH. *Psychopharmacology Bulletin*, 21, 839–844.
- Nadeau, K. G. (1995). Life management skills for the adult with ADD. In K. G. Nadeau (Ed.). *A comprehensive guide to attention deficit disorder in adults: research, diagnosis, and treatment* (pp. 191–217). New York: Brunner/Mazel.
- Orvaschel (1985). Psychiatric interviews suitable for use in research with children and adolescents. *Psychopharmacology Bulletin*, 21, 737–745.
- Pelham, W. E., Jr., Wheeler, T., & Chronis, A. (1998). Empirically supported psychosocial treatments for attention deficit hyperactivity disorder. *Journal of Clinical Child Psychology*, 27, 190–205.
- Quay, H. C., Focacci, M., Quayle, A. J., Politch, J. A., & Anderson, D. J. (1997). Inhibition and attention deficit hyperactivity disorder: optimized assay for antisperm cell-mediated immunity. *Journal of Abnormal Child Psychology*, 25, 7–13.

- Ratey, J. J., Greenberg, M. S., Bemporad, J. R., & Lindem, K. J. (1992). Unrecognized attention-deficit hyperactivity disorder in adults presenting for outpatient psychotherapy. *Journal of Child and Adolescent Psychopharmacology*, 2, 267–275.
- Safren, S. A., Sprich, S., Chulvick, S., & Otto, M. W. (2004). Psychosocial treatments for adults with attention-deficit/hyperactivity disorder. *Psychiatric Clinics of North America*, 27, 349–360.
- Shear, M. K., Vander Bilt, J., Rucci, P., Endicott, J., Lydiard, B., & Otto, M. W., et al. (2001). Reliability and validity of a structured interview guide for the Hamilton Anxiety Rating Scale (SIGH-A). *Depression & Anxiety*, 13, 166–178.
- Shekim, W. O., Asarnow, R. F., Hess, E., Zaucha, K., & Wheeler, N. (1990). A clinical and demographic profile of a sample of adults with attention deficit hyperactivity disorder, residual state. *Comprehensive Psychiatry*, 31, 416–425.
- Southam-Gerow, M. A., Henin, A., Chu, B., Marrs, A., & Kendall, P. C. (1997). Cognitive behavioral therapy with children and adolescents. *Child & Adolescent Psychiatric Clinics of North America*, 6, 111–136.
- Spencer, T., Biederman, J., Wilens, T., & Faraone, S. V. (1994). Is attention-deficit hyperactivity disorder in adults a valid disorder? *Harvard Review of Psychiatry*, 1, 326–335.
- Spencer, T., Biederman, J., Wilens, T. E., & Faraone, S. V. (1998). Adults with attention-deficit/hyperactivity disorder: a controversial diagnosis. *Journal of Clinical Psychiatry*, 59(s7), 59–68.
- Spencer, T., Wilens, T., Biederman, J., Faraone, S. V., Ablon, J. S., & Lapey, K. (1995). A double-blind, crossover comparison of methylphenidate and placebo in adults with childhood-onset attention-deficit hyperactivity disorder. *Archives of General Psychiatry*, 52, 434–443.
- Sprich, S., Biederman, J., Crawford, M. H., Mundy, E., Faraone, S. V., & Stevenson, J. (2000). Adoptive and biological families of children and adolescents with ADHD. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39, 1432–1437.
- Wechsler, D. (1997). *The Wechsler Adult Intelligence Scale (3rd ed.)*. San Antonio, TX: The Psychological Corporation.
- Weiss, G., & Hechtman, L. (1993). *Hyperactive children grown up* (2nd ed.). New York: Guilford Press.
- Wender, P. H. (1998). Pharmacotherapy of attention-deficit/hyperactivity disorder in adults. *Journal of Clinical Psychiatry*, 59(s7), 76–79.
- Wilens, T., Biederman, J., Prince, J., Spencer, T., Faraone, S., & Warburton, R., et al. (1996). Six-week, double-blind, placebo-controlled study of desipramine for adult attention deficit hyperactivity disorder. *American Journal of Psychiatry*, 153, 1147–1153.
- Wilens, T. E., Biederman, J., Brown, S., Monuteaux, M., Prince, J., & Spencer, T. J. (2002). Attention deficit/hyperactivity disorder across the lifespan. *Annual Review of Medicine*, 53, 113–131.
- Wilens, T. E., Biederman, J., & Mick, E. (1998). Does ADHD affect the course of substance abuse? Findings from a sample of adults with and without ADHD. *American Journal on Addictions*, 7, 156–163.
- Wilens, T. E., Biederman, J., & Spencer, T. J. (1998). Pharmacotherapy of attention deficit hyperactivity disorder in adults. *CNS Drugs*, 9, 347–356.
- Wilens, T. E., Spencer, T. J., Biederman, J., Brown, S., Tanguay, S., Monuteaux, M. C., & Blake, C. (2002). A review of the pharmacotherapy of adults with attention-deficit/hyperactivity disorder. *Journal of Attentional Disorders*, 5, 189–202.
- Williams, J. B. (1988). A structured interview guide for the Hamilton Depression Rating Scale. *Journal of Psychiatric Research*, 22(s1), 55–85.